

SEROLOGICAL EPIDEMIOLOGY

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## SEROLOGICAL EPIDEMIOLOGY

/Following is the translation of a review of a book by (Editor) Doctor of Medical Sciences K. G. Vasilyev, published by the Academy of Sciences Publishing House, Latvian SSR, Riga, 1963, 84 pages (1000 copies printed), price 11 kopeks. This book was reviewed by I. I. Shatrov, et al. and appeared in the Russian-language periodical Zhurnal Mikrobiologii Epidemiologii i Immunobiologii (Journal of Microbiology, Epidemiology and Immunobiology) #2, 1965, pages 152--155. Translation performed by Sp/7 Charles T. Ostertag Jr./

In opening a book, published under the editorial supervision of K. G. Vasilyev, with such a specialized name as "Serological Epidemiology," the reader has the right to expect from its authors an exposure of the stated theme, and primarily the basis for the concept itself. Unfortunately these expectations prove to be in vain. It is already apparent from the preface that the name of the collection has an accidental nature and is conditioned only by the fact that "the basic methods ... of investigations were methods, taken from the field of serological epidemiology ... ." In actuality "in ... the collection works are published on the problems of the epidemiological study of and the implantation in public health practice of new means for the specific prophylaxis of viral diseases" (page 3).

As regards the very term "serological epidemiology" then it must be pointed out that first of all the object of investigation, which determines the method (or its peculiarities), characterizes the separate science (or its division) and not conversely. Stemming from this principle, it is difficult to take exception, as an example, to the existence of "sanitary microbiology" or "atomic physics." And in this same sense the separation of a branch of science under the name of "serological epidemiology" is unacceptable, since only the extent of serological investigations changes in the absence of a new object and method.

The development of antibodies is not the only reciprocal reaction of an organism to the introduction of a causative agent. If the authors of "serological epidemiology" were systematic, then in taking into consideration the Schick, Dick, Burnet and Pirquet reactions and tests with tularin during the mass investigations of a population they should have set aside such branches as "reactive" and "allergic epidemiology." It is apparent that there cannot be such a method of differentiation. And finally the statement cannot be accepted at all that "serological epidemiology is the synthesis of usual methods of epidemiological investigations and mass serological investigations ..." (page 5) since this converts epidemiology into a component part of "serological epidemiology."

With the aim of studying the regularities of the epidemic process, together with epidemiological investigation and observation various methods are used. This is done by including their component parts in the epidemiological method. These methods of investigation (microbiological, clinical, immunobiological, statistical, experimental, sanitary-chemical), taken from

neighboring sciences, are subordinate to a specific goal extending beyond the frame of investigation of those sciences from which they are taken and in which they are the main method of investigation. In epidemiology they cease to be a method, since other problems are resolved with their help. As an example take the microbiological method in epidemiological investigations. In microbiology the microorganism is the subject of study. During an investigation of an epidemic outbreak it is sufficient for the epidemiologist that the fact be established of the presence of a specific causative agent in the water, milk or other objects of the external environment. From these same positions it is necessary to consider the utilization of the immunological method for an analysis of epidemiological phenomena. As a result of such a collaboration the two sciences mutually benefit each other, but a hybrid from such a crossing in the form of "serological epidemiology" cannot be obtained, just as well as there cannot be a clinical, statistical, microbiological, molecular or other epidemiology.

The significance of precise terminology is indisputable -- it does not give rise to interpretations with two meanings. Cluttering up of terminology and inaccurate formulation may only disorient scientific and practical workers, as this occurred quite recently with the concept "liquidation of infections."

There are eight works in the collection being reviewed.

In the introductory article by K.G. Vasilyev "Serological epidemiology as one of the specializations of epidemiological investigations," the author attempts to substantiate the rightfulness in the existence of serological epidemiology. The field of application of serological epidemiology, in the opinion of K. G. Vasilyev, includes the following branches.

1. "The study of the extent and nature of the distribution of the causative agents of infectious diseases among the population." Of course this task may be resolved with the help of mass serological investigations, however the basis of their necessity in the general formulation of the author is completely insufficient.

2. "The study of the processes of evolution of the causative agents and the related processes of evolution of the epidemiological peculiarities of the diseases caused by these causative agents." To us this aspect of the investigations is very puzzling. Have the causative agents already changed? What periods are required in order to discern these changes? How should the causative agent be changed so that the preserved antibodies do not enter into the reaction with it? Is human life sufficient (or even the life of several generations) in order to follow these changes? All this is very problematic and requires serious basis in order to lay claim to being a separate aspect in investigative work.

3. "The study of the means of specific prophylaxis." This aspect of investigations is also in need of an explanation. If this deals with the study of vaccines on limited contingents, then what epidemiology is this? A determination of the effectiveness of preparations in epidemiological tests may dispense with immunological investigations since the very fact of a change in the level of incidence answers the question concerning the epidemiological effectiveness of the preparation.

4. "Clearing up the causes of certain epidemiological peculiarities of infectious diseases (seasonal nature, periodicity), and in a number of cases the establishment of epidemiological prognoses." In order to be understood, K. G. Vasilyev should have explained in what manner these problems may be resolved with the mass serological investigations of the population. As regards the seasonal nature of infectious diseases, then in our opinion the data of immunology can hardly help in clearing up the reasons for it.

5. "Resolving particular problems which sometimes emerge during an epidemiological investigation (for example, clearing up the source and means of spreading of the infection)." This thesis is also devoid of any argument. For clearing up the source of infection serological investigations may turn out to be useful sometimes. As regards an approval of the feasibility of using this method for studying the path of spreading of an infectious disease then it has no basis at all.

Based on serological reactions it is not always possible to establish the antiquity of the disease or to distinguish a past recovery from the disease from the reaction of the organism to prophylactic inoculation. This indisputably narrows down the feasibility of the stated method, the area of application of which should be clearly specific.

A mistaken attitude toward the feasibility of the stated method is also expressed in the works by the co-authors of K. G. Vasilyev. The authors of the collection made use of mass serological investigations of the population, though in our opinion they were not always justified and necessary.

Thus, in the article by K. G. Vasilyev et al. (page 27) it is reported that mass serological investigations indicate the "direct correlation between the fluctuations in influenza incidence and the indices of humoral immunity to it in the population." And can it be otherwise? Are such investigations necessary with influenza, in respect to which it is known that the dynamics of the epidemic process depend on the level of immunity to it in the population? (Just as with other droplet infections.)

The materials of mass serological investigations conducted by R. P. Feoktistova "testify to the existence of a specific (?) correlation between the flow of the epidemic process and the level of antimorbillous immunity in the population" (page 44). Similar investigations for obtaining a conclusion which has been known for a long time are hardly necessary. "The results of serological investigations," the author writes further, "testify also that the nature of measles incidence in the republic is regulated to a significant degree (?) by the state of the humoral immunity of the population to this disease" (page 50). And how can it be otherwise? And perhaps this is characteristic only for the republic, and is not a regularity in the movement of the epidemic process for measles in general? And not only for measles, but for droplet infections in general?

On the basis of the serological investigations conducted by S. F. Alexandrov the unoriginal conclusion is made that "the most rapid increase of humoral immunity to epidemic parotitis belongs to the age groups showing the

most incidence with epidemic parotitis" (page 77). This provision has not required confirmation since a long time ago.

The "discoveries" made by the authors of the three articles do not merit attention in themselves. Their only interest lies in the fact that, despite the desire of the authors, they show when mass serological investigations should not be conducted.

The article by K. G. Vasilyev et al. ("Seroepidemiological Parallels Between Measles and Epidemic Parotitis" is devoted to an analysis of the development of outbreaks with these infections. We agree with the authors that the peculiarities of the mechanism of transmission in various infections may determine the different intensity in the flow of the epidemic process during these diseases. However, it must be noted that this conclusion was made even earlier on the basis of epidemiological observations, without the use of mass serological investigations. Apparently, serological investigations should be purposeful, should promote the clearing up of some narrow problems, and not characteristic of the epidemic process in general.

There is interest in the data of R. P. Feoktistova concerning the frequency of detecting antibodies to the measles virus in the various age groups. From these materials it follows that the increase in the immune layer among the population is continuing as a result of the adult population (over 20 years) having had the measles. Of course investigations of such a nature are useful. But when the author writes that "the resulting ... data testifies to the significant dissemination of the measles virus ..." (page 49), then this already causes perplexity in the reader. Did we not know, prior to mass serological investigations, that the entire population had had measles?

The abundance of theoretical errors also adds to the shortcomings of the collection.

It is known that the epidemic process is continuous, but in this continuity during droplet infections a definite periodicity is noted. In connection with this, in the article on influenza by K. G. Vasilyev et al. it is quite odd to sound the phrase, "And since this virus has not completely disappeared ..." (page 27), as if the discourse was about liquidating this disease. Another article by K. G. Vasilyev et al. contains confirmation that "measles incidence does not show a tendency to lowering" (page 53). And why in the given historical stage should such a tendency be shown? The authors point to the "difficulty in liquidating measles with help of measures of just a general prophylactic nature ..." (page 54). In this case there should be talk not of the difficulty but of the impossibility of liquidating this infection with such measures.

The article by R. P. Feoktistova, "Serological Epidemiology of Measles in the Latvian SSR," cannot but induce an objection to the expression "... in areas which are epidemic for measles ..." (page 43), since it is known that only in isolated territories this infection may be absent for any prolonged period of time before the next time it is brought in. In this same article

the author confirms that "at the present time measles incidence in the republic bears mainly a sporadic nature with systematically recorded epidemic outbreaks in children's establishments and periodically emerging epidemic rises and drops" (page 46). This sounds very original. It is not likely that one can agree with the characteristic of children's collectives as "sources of outbreaks and epidemics of measles" (page 46). First of all, in children's collectives epidemic outbreaks do not emerge by themselves, but as a result of the infection being brought in. Secondly, children's collectives with a high level of incidence can more correctly be viewed as mass epidemic foci, from which this disease may receive further distribution, and not as "sources of epidemics." The citation of L. V. Gromashevskiy and G. M. Vayndrakh brings out an objection, since those authors do not have such a conception.

In the article "Serological Epidemiology of Epidemic Parotitis in the Latvian SSR" S.F. Aleksandrova writes, "Based on similarity with other respiratory infections, it is possible to think that the most active means for the prevention of parotitis are the means of specific prophylaxis" (page 67). And the same kind of phrase is in another article (page 54). First of all, here there is no analogy at all -- in respect to droplet infections the measures for combating them are determined by the regularities of their distribution and in particular by the dependency of the dynamics of incidence on the level of immunity of the population. Secondly, the doubt which is expressed by the words "it is possible to think" has no justification, since this method for combatting infections of the respiratory tract is an established fact. And finally, in conclusion the author refutes herself, "The resulting data make it possible to place under doubt the regulatory role of humoral immunity in the spreading of epidemic parotitis" (page 79). It is not clear on what this statement by the author is based, but it contradicts epidemiological practice.

Several articles of the collection persistently develop the idea that the introduction into practice of specific prophylaxis of droplet infection should precede the detailed study of the epidemiology of this infection, its regional peculiarities and the carrying out of mass serological investigations. This sounds quite strange: The known regularities in the spreading of droplet infections made it possible a long time ago to come to the conclusion that a common effective method for combatting them is active immunization, and any stratification in this respect can only slow down the struggle with them. For example, the liquidation of smallpox was achieved without a study of "regional" epidemiology and without mass serological investigations.

In the article "A study of Live Antimeasles Vaccine in the Latvian SSR" K. G. Vasilyev et al. mention the "regional epidemiological peculiarities of measles," but not in this nor in the other articles of the collection is there any data which would characterize these "peculiarities." The authors should have spoke on the question that under regional epidemiology they understand anthroponotic infections. Further materials are presented mainly on the reactivity of the vaccine and nothing at all is said about the epidemiological effectiveness of the preparation. However the authors have dared to affirm that the "use of it (the vaccine -- author) would already have completely ensured the prophylaxis of measles in schools" (page 63). Actually the facts for such a confirmation are lacking and this unsubstantiated statement will not likely convince anyone.

Also provoking perplexity are the articles in the collection with promising titles, but dealing with unfinished investigations. Thus, K. G. Vasilyev et al. report in the article "Epidemiological Characteristics of Influenza in the Latvian SSR and the Organization of a Test of Its Specific Prophylaxis" that in the end of 1962 (page 29) an extensive test was conducted on the specific prophylaxis of influenza. One of the missions of it was the study of the epidemiological effectiveness of a vaccine. There is no necessity to prove how important these results are. But the authors disappoint the reader by not even presenting the preliminary results of the test. However, reliable data, apparently, will not be generally presented, since the control groups were formed "from a number of people, who for some reason or other were not subjected to vaccination" (page 30).

The collection was edited carelessly. Thus, in the appropriate article by K. G. Vasilyev et al., in lieu of the epidemiological characteristics of influenza the curve of incidence is skipped over with the artificial separation of three phases, which in our opinion has no basis: The phase of dissemination of the virus (?), the vigorous spread of influenza (September - December 1957 and October 1958 - March 1959 -- essentially two seasonal waves, Author), and the post pandemic period with the "regular fall-winter rises (pages 25-26). It is completely incomprehensible why the spread of one disease is connected with another. "... In 1959 the level of immunity to the A2 virus became so high that the further spreading of a virus of this type (why virus and not the disease caused by this virus?) became little possible. In connection with this the circulation of the type B virus increased ..." (page 27). And further (page 29) "... We assume the feasibility of an increase in the circulation of the type B virus and in connection with this an increase in incidence with type A2 influenza." It is completely incomprehensible what the connection may be here.

In the article by R. P. Kecktistova the epidemiological characteristics of measles in the republic are reduced to an enumeration of several numbers which add little to our knowledge of the epidemiology of this infection. The author cites indices and their average errors which without a doubt are correct. However, the calculations of the average errors was, as is apparent from the text, a self goal, since they were not used in the analysis of the results.

The article by A. K. Berzupe and L. G. Berger, "Immunological Shifts in Persons Inoculated with Live Anti-influenza Vaccine," is purely an immunological work. The study of the immunological effect of vaccination was done without taking into consideration the incidence (at any rate nothing is said about it in the article) and therefore one can have doubts that the increase in the titer of antibodies was connected in all cases with the vaccine and not with natural recovery from the disease. The periods for conducting the investigations were not indicated and thus it is impossible to compare the data obtained with the movement of the epidemic process in this period of the year.

In conclusion we will present several examples of the characteristic language of the collection: "little possible distribution" (page 27), "average yearly normal level" (page 46), "immunological maturity" (page 50), "cumulative data" (page 84), "corresponding co-workers" (page 3), "manifest infection" (page 83), "revived circulation of the virus" (page 27 and others). All these expressions do not decorate the book.

It must be acknowledged that the publication of the book was not justified by anything and in the future it is necessary that the Publishing House of the Latvian SSR Academy of Sciences have a stricter approach to the selection of materials for publication.